the heart and lungs, increased between each heart beat and expulsion of breath, denying to both heart and lungs the necessary space for normal function, brings about a stoppage of the heart. Death from suffocation alone would not be so rapid.

The family *Boidae* comprises the boas and pythons and contains the largest known snakes, although the vast majority do not attain great length. They are primitive creatures and some of them retain structures that clearly indicate their development from lizard-like ancestors. Fossil remains from the Cretaceous rock, having an age of about 60,000,000 years, show no great difference from the boas and pythons of the present day, so it is evident that they have changed but little during the past ages. Among the primitive characteristics they possess is the pelvis, which is found in no other snakes, except a few closely related families. In addition most of them have rudimentary legs, and small head scales. There is an absence of large, symmetrical shields.

The chief and most apparent difference between the boas and pythons is the presence of premaxillary teeth in the pythons and their absence in the boas. But there are enough exceptions to this rule to make necessary the use of another characteristic as a definite line of cleavage. This is the presence of a supraorbital bone in the pythons. Those genera of pythons which lack the premaxillary teeth, *Chondropython, Aspidites* and *Calabaria*, occur in the Old World, the first two in New Guinea, the latter (a burrowing snake) in Africa. The first mentioned is extremely similar in appearance to the dog-nosed boa, or parrot snake of South America.

The pythons are almost entirely Old World inhabitants, the only American representative being a small snake, *Loxocemus bicolor,* occurring in Mexico. The boas are found in both hemispheres, and it is remarkable that Madagascar has a close relative of the famous boa constrictor of the American tropics. This snake is known scientifically as *Constrictor madagascariensis.*

Its presence on the island emphasizes from the point of view of its fauna the peculiarity of the region in relation to continental Africa.

The boa constrictor (*Constrictor constrictor*) is one of the best known and largest of the American representatives of the group. It very rarely is more than twelve feet long, but it has been credited with devouring as large an animal as a horse—a physical impossibility, even though the snake's skin is capable of remarkable expansion. Like the species of *Boa* and *Epicrates,* this reptile is an excellent climber and gets about with remarkable facility. Often quite hardy and good natured it is looked upon by snake fanciers as an excellent pet. Its food consists of birds and relatively small mammals.

Though relatively harmless, usually making every effort to escape from man, the boa constrictor is greatly feared by the natives. Most of them believe it is poisonous and that it will attack man and even go in search of him. It occasionally finds its way into native villages, evidently attracted by the presence of fowl, and may even enter the houses. Upon such occasions the natives flee precipitately. In Colombia, a ten foot boa once wandered into a native hut just before dusk and made itself quite at home, even appropriating a bed upon which to rest. The residents of the house fled and would not return until the snake had been killed by a white man. There were further complications because the natives believed the snake's mate would come in search of it.

For great size among snakes honors must go to the anaconda or water boa (*Eunectes murina*). There are reliable records of twenty-nine foot specimens, and it is possible that even larger ones exist. There has been a claim that a forty foot specimen was killed in Brazil, but this has not been substantiated. The probability is that the snake in question was not over thirty feet. The measurement was made on a skin without head, the length being approximately thirty-five feet, but inasmuch as the skin is easily stretched no reliance can be placed upon the record. The

OTHER LARGE SNAKES

Species	*Probable Maximum Length*	*General Distribution and Remarks*
King cobra	18 to 19 feet	China, India, Malay Archipelago, Philippine Islands and adjacent areas. The largest verified record for this species is 18 feet 4 inches. The head of this specimen is in the Museum of Comparative Zoology at Harvard.
Black mamba	14 to 15 feet	Central and South Africa. The longest venomous snake except for the king cobra.
Bushmaster	11 to 12 feet	From Nicaragua southward throughout tropical South America.
Taipan	10 to 11 feet	Australia. This species and the giant brown snake are the longest venomous snakes in Australia.
Giant brown snake	9 to 10 feet	Australia. An Australian biologist states that he measured one over 9 feet in length.
Indigo or gopher snake	9 to 10 feet	Southern United States and Mexico. One measurement of 8 feet 7½ inches has been made, and there is one 13-foot skin (stretched?) on record. Probably the longest snake in the United States.
Black chicken snake; pilot black snake	8 to 9 feet	Eastern United States. One specimen of 8 feet 5 inches is known.
Bull snake	8 to 9 feet	Middle United States. One of 7 feet 8 inches is known, and another of 9 feet has been reported. The 9-foot specimen is doubted by biologists.
Coachwhip	8 to 9 feet	There is one record of 8 feet 2 inches.
Eastern and western diamondback rattlesnakes	7 to 8 feet	Without rattle. Central, southern and western United States.

exaggerate any more than you or me, told me of a western diamondback just over 8 feet that was killed on his ranch near Hebbronville, Texas. Present-day herpetologists, however, do not recognize lengths of rattlesnakes that include the rattle, presumably because the rattle is often broken. Thus the probable maximum lengths for rattlesnakes in the accompanying table is somewhat less than the above figures.

Do Big Snakes Eat Human Beings?

All who have investigated this matter agree that the big snakes do not attack human beings as frequently as they are reported to; nevertheless, it seems well established that a few such attacks have occurred. Several writers cite cases which they are convinced are authentic. In one instance in the East Indies, a boy of fourteen was swallowed by a python. The snake was discovered a short time later, killed, and the boy's body extracted. The size of the snake is not mentioned. Another incident occurred on the island of Ukerawe in Lake Victoria, Africa. Here, according to the story, a woman was killed by a python that measured only slightly over 14 feet. The snake was discovered coiled about the woman's body and was killed before it had had a chance to try to swallow it, although it is most improbable that such a small snake could have swallowed an adult human being.

One instance is of particular interest, since Frank Buck, an experienced person, was at hand when it occurred. The headsman of a tribe in the Philippine Islands kept in a cage a 25-foot python which was looked upon with reverence by the natives. One day the snake escaped and, when it was found, there was a large bulge in its body, indicating that it had recently fed. Buck himself felt the outline of a human body within the snake, and several counts of the headsman's numerous children revealed that one was missing. This incident disturbed the headsman not one whit: He apparently felt that he could afford to lose additional children rather than part with his precious python. At any rate, the python was returned to its cage and allowed to digest its meal in peace.

Recently the anaconda of South America has come in for its share of attention with respect to killing human beings. Biologist Rolf Blomberg, who captured a 23-foot anaconda in South America some years ago, investigated many stories and found two that he considered authentic. In both cases the victims were attacked in the water, while swimming. One was an adult, and apparently he was too large for the snake to swallow. In the other case, which involved a 13-year-old boy, the body was swallowed, but some 24 hours later, the father of the boy discovered the snake partially out of the water where it had regurgitated the body. The snake was killed, but unfortunately no record was made as to the size of the serpent.

What Is the Largest Snake?

A short time ago a youngster came into my office and asked if I knew that some boa constrictors grew to be as long as a building to which he pointed. I looked at the building across the street, and saw that it was at least 75 feet long. I then assured my questioner that I did not know that the boa constrictors grew this large and asked him where he received this interesting information. He said that an older boy had given him the figures and loyally maintained that his friend was an expert on snakes. He was quite disappointed when I showed him several books which stated that the true boa constrictor is not a very large snake, and that the largest known measurement for any snake was considerably less than he had thought. This story illustrates two ideas that many people have. One is that the name boa constrictor can be properly applied to all large snakes; the other—if they know that there are several large species—is that the boa constrictor is by far the largest. Another common belief is that many of the large snakes routinely grow to lengths of 60 to 70 feet.

The term boa constrictor should be applied to only one kind of snake, and reference to the table on page 183 will show that several snakes are larger. We must become resigned to the fact that no living snake attains a length of 60 or 70 feet, although an extinct snake, remains of which have been found in Egypt, is estimated to have attained a length of 50 feet or more.

The two chief competitors for the title of the world's largest snake are the anaconda of South America and the reticulated python of the Far East. Some years ago essentially all herpetologists (except possibly for those in South America) accepted the python as the champion without reservation. There is one authentic measurement of 33 feet for this serpent. Now the sentiment is swinging toward the anaconda. Some biologists now accept, tentatively, a 37½-foot anaconda measured by an engineer in Colombia, and a man wrote me from Canada that he killed one in Brazil some years ago that was 42 feet in length. One difficulty so far as the anaconda is concerned is that the largest specimens occur in areas so inaccessible that it is almost impossible to transport really big snakes either alive or dead.

Very little information is available about the weight of anacondas over 20 feet in length, but most herpetologists are agreed that these snakes are considerably heavier than pythons of the same length. A 19-foot anaconda was found to weigh 236 pounds, but it was later found that this particular snake had "cheated"; she later gave birth to 72 youngsters! A. Hyatt Verrill gives a weight of 360 pounds for an anaconda slightly longer than the above. Based upon the weights of smaller serpents of known lengths, biologists have estimated that a 30-foot anaconda would weigh about 600 pounds, and that a 40-foot giant would tip the scales at 1,000 pounds.

Pythons cannot do nearly as well in the weight department as anacondas, although this could be because more information is available relative to longer specimens. A 28-foot reticulated python, exhibited by Hagenbeck, weighed 250 pounds, and another just over 27 feet weighed 191 pounds. It has been estimated that a healthy reticulated python of 30 feet would weigh about 350 pounds.

Incidentally, at this writing, the largest snake on exhibition in the United States and probably in the world, is in the Pittsburgh Zoo. Appropriately named Colossus, this reticulated python measured 28½ feet in 1956. It is now believed that this snake is at least 30 feet in length.

The king cobra, with no close competitors, is the longest venomous snake in the world. There is one authentic measurement of 18 feet 4 inches, while another specimen over 19 feet long has been reported. The eastern diamondback rattlesnake of the United States has the distinction of being the heaviest poisonous snake in the world. It is very heavy-bodied as contrasted to the slender king cobra.

I feel quite sure that both the eastern and western diamondback rattlesnakes occasionally exceed 8 feet in length if the rattle is included in the measurement. The late Dr. Raymond Ditmars stated that he had measured two eastern diamondbacks over 8 feet long, the longest of which was 8 feet 6 inches. And in the summer of 1962, a friend of mine, who does not

LARGE SERPENTS OF THE BOA AND PYTHON GROUP

Species	*Probable Maximum Length*	*General Distribution and Remarks*
Anaconda	35 to 40 feet	South America. There is one specimen of 37½ feet, "partially authenticated."
Regal or reticulated python	33 to 35 feet	Malay peninsula, Burma, Indochina, China, Philippine Islands, and adjacent regions. One 33-foot specimen has been measured.
African rock python	20 to 25 feet	Africa.
Diamond python	20 to 21 feet	Australia and New Guinea.
Boa constrictor	17 to 19 feet	Southern Mexico, Central and South America. One specimen of 18 feet 6 inches is on record.

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teindre jusqu'à huit mètres et même davantage, assure-t-on.

La peau de ce boa est verdâtre avec des taches sombres; le ventre est clair, d'un jaune terne. Au Matto-Grosso, on l'appelle sucury; on dit qu'il est le roi des serpents, parce qu'il est capable de tuer les serpents venimeux et même ceux de sa propre taille. Ses dents servent de sérum, croient les indigènes. Il ne craint pas leur venin et il est certes plus musclé que tous les autres. Personnellement j'en ai vu un, qui digérait un serpent venimeux presque de sa taille.

Sa peau est très solide; tannée elle peut servir à plusieurs usages. Au Matto-Grosso, les gens aiment à s'en faire des ceintures qu'ils croient efficaces contre les maux de reins et les rhumatismes.

Le boa se nourrit de petits mammifères et d'oiseaux qu'il va dénicher jusqu'au sommet des arbres. Ceux de forte taille peuvent attraper même les carpinchos et de petits caïmans. Seuls, les très grands boas attaquent parfois les hommes, prétend-on. Ce que je puis affirmer, c'est que, lorsque l'on passe à côté d'eux et qu'ils ne sont pas endormis, ils redressent la tête, semblent menacer, puis se sauvent; d'autres, engourdis, ne bougent même pas.

Dans les marais du Matto-Grosso, j'ai vu un boa de moins de trois mètres, tenant enroulé entre ses anneaux un de ces gros canards de la taille d'une oie. Comme j'avançais vers lui, il souffla un peu, menaçant, puis se sauva, abandonnant sa victime. J'en ai vu un autre qui digérait un serpent jaracusu; j'en vis un également dont l'estomac contenait un petit jacaré d'un mètre. Mais le boa ne semble pas s'en prendre aux jacarés ou caïmans de taille relativement grande. J'ai vu un jacaré qui venait de tuer un boa et s'apprêtait à le dévorer.

Le boa s'apprivoise parfaitement, surtout lorsqu'il est jeune. Bien des riverains de l'Amazone en ont chez eux, qu'ils laissent en liberté et qu'ils apprécient pour leur utilité. En effet, ces reptiles, accoutumés à l'homme, ne s'écartent guère de la demeure. Ils tuent tous les serpents venimeux qui en approchent; et nous avons vu qu'à taille égale ils les maîtrisent.

Ils peuvent également grimper aux poutres, se faufiler dans la toiture où ils semblent se tenir de préférence. Ils y capturent ou en délogent les rats et les vampires. Ils remplacent ainsi avantageusement les chats, que l'on ne rencontre jamais dans ces habitations. Parfois, un boa de trois ou quatre mètres voisine ainsi avec la famille. Sa force lui permettrait peut-être d'étouffer les personnes, mais il ne leur fait jamais de mal, pas plus qu'aux chiens qu'il connaît. Cependant, lorsqu'il est grand, il devient redoutable; il peut faire son menu de quelque chien et il est surtout à craindre pour les nouveaux-nés. C'est pourquoi l'on s'en débarrasse. On l'appelle giboia, dans la contrée.

Même en ville, des commerçants gardent quelquefois un giboia dans leur entrepôt, où il tue bien mieux les rats et les souris que ne le feraient les chats. Aussi longtemps qu'il est petit, il a l'avantage de se faufiler et de pénétrer dans les trous.

A Manaos, je rencontrai un nègre, courtier en produits de la région, qui avait chez lui une véritable collection de boas. Il en avait une vingtaine, de toutes tailles, soit isolés dans des caisses séparées, soit par couples, mâle et femelle, suivant la taille et l'espèce. Il prétendait qu'il existe nombre de variétés de boas, qu'il déterminait d'après la teinte de la peau ou des écailles. Certains, en effet, étaient plus clairs, d'autres plus sombres, l'un plus brillant, plus bleuté, à reflets métalliques. Il les connaissait tous, les appelait par leurs noms et ils le connaissaient également.

Non seulement la peau des grands serpents est utilisée, mais les civilisés indigènes recueillent aussi la graisse qui entoure les intestins du boa. Ils la fondent pour en extraire l'huile. Cette huile n'est pas comestible; elle est plus ou moins corrosive, excellente pour dérouiller le fer. Toutefois, immédiatement après l'emploi, il faut soigneusement sécher l'objet, car cette graisse ronge plus que le pétrole.

Boa d'eau. — Ce serpent, de taille souvent monstrueuse, est surtout connu sous le nom de anaconda. Il n'est pas venimeux, mais il est redoutable pour sa force considérable; il est capable de briser les os des plus grands mammi-

Marquis de WAVRIN : Les Bêtes sauvages de l'Amazonie (Paris, Plon, 1951, pp. 151-159) fères. Il a l'aspect du boa constrictor : la tête est un peu plus courte et plus plate; ses écailles, beaucoup plus sombres, forment les mêmes dessins. Souvent les boas d'eau paraissent même noirâtres. Ceux que l'on rencontre le plus couramment le long des rivières mesurent de six à huit mètres. J'en ai vu de dix mètres et il y en aurait de plus grands encore, s'il faut en croire les indigènes.

On peut redouter leur voisinage dans toute l'Amazonie, le long des fleuves et des rivières, ainsi que dans les lagunes ou les marécages. Ils fréquentent surtout les poches d'eau profondes et les remous où ils se tiennent cachés, soit aplatis sur le fond, soit dans quelque anfractuosité du rivage, soit encore entre les racines des arbres abandonnés par le courant. Ils remontent les affluents même les plus reculés de l'Amazone et de l'Orénoque; à la saison sèche, les plus grands quittent les eaux trop peu profondes, descendant probablement alors vers les grands fleuves pour remonter au moment des crues. On m'a assuré à diverses reprises, au Putumayo notamment, que l'on peut voir alors les stries ou vagues formées par un de ces monstres qui nage entre deux eaux.

A la saison des pluies, lorsque l'atmosphère est particulièrement chaude et lourde, l'on voit parfois un de ces serpents endormi sur la rive où il forme un monticule de plus d'un mètre de haut, ou bien se tenant enroulé sur quelque maîtresse branche ou un tronc d'arbre incliné au-dessus du courant, d'où il se laisse choir ou se lance sur l'animal qui passe à sa portée.

Le boa constrictor plonge; pour respirer, il doit tout au moins sortir les narines. Le anaconda, au contraire, vit plus sous l'eau qu'à la surface. Il passe des mois dans son repaire, à une certaine profondeur, sans en sortir. Fait plus étrange, et le anaconda partage en cela les avantages du caïman, lorsque les indigènes empoisonnent au barbasco un cours d'eau ou une lagune, tout le poisson périt irrémédiablement, mais ces reptiles ne semblent même pas incommodés. Une cartouche de dynamite jetée à l'endroit où l'un d'eux s'est retiré, ne paraît pas produire plus d'effet. Le seul

moyen de le tuer est donc de l'assommer en terrain sec, à l'aide d'un fort gourdin proportionné à sa taille, en s'approchant doucement lorsqu'il est endormi; ou encore, on lui loge une balle à la naissance de la tête. Toutefois, il est impossible de le tuer net; même mort, ses muscles pantellent encore tout un temps.

Ce serpent s'est fixé non seulement dans le bassin de l'Orénoque et de l'Amazone, mais également, semble-t-il, dans les hauts rios Paraguay et Parana. Vers le haut fleuve Paraguay, on appelle miñocao un serpent plus ou moins fabuleux; les indigènes prétendent qu'il peut atteindre la grosseur d'une pirogue. Ils se figurent que c'est le sucury ou boa constrictor devenu très vieux et transformé en serpent d'eau. Dans le haut Rio Parana, en territoire brésilien, on m'a également parlé de ces serpents énormes, capables d'entraîner une pirogue vers le fond. Ces monstres fréquentent les endroits déserts et ne s'écartent jamais du fleuve. La crainte qu'ils inspirent est plutôt superstitieuse.

Si les indigènes ont souvent une tendance à exagérer lorsqu'ils en parlent, il n'y a pas de doute qu'en réalité ils commettent des méfaits. Pour ceux de grande taille, le caïman est une proie très normale. On assure même qu'ils mangent un bœuf. Surprenant la bête au moment où elle vient boire à la rivière, ils l'entraînent vers le fond de l'eau, l'enveloppent de leurs anneaux, lui rompent les os, puis l'avalent. On prétend même, chose plus incroyable, qu'ils digèrent leur proie sans l'avaler en entier, ne parvenant pas à engloutir la tête à cause des cornes.

Ces serpents attaquent l'homme pour en faire leur proie. Néanmoins, c'est bien à tort qu'on leur attribue nombre d'accidents. Un Jivaro se noie-t-il, sa mort est attribuée, par les siens, au panghi. C'est ainsi que je trouvai un clan fort affairé : un excellent nageur venait de périr en traversant un torrent impétueux, parsemé de grandes roches.

Des Indiens Jivaros me désignèrent, en manifestant leur crainte, la courbe d'une rivière un peu plus large à l'endroit où se formait un remous. C'est là, me dirent-ils, que, à peine un mois auparavant, une pirogue montée par deux enfants s'était retournée; jamais on n'avait retrouvé les cadavres; le panghi avait dû les noyer et les dévorer.

Deux Indiens descendaient le Rio Curaray en pirogue. Ils allaient arriver devant leur demeure, lorsque celui qui dirigeait à l'arrière de l'embarcation poussa un cri. Son compagnon se retournant ne put qu'entrevoir une tête monstrueuse qui avait saisi l'homme et l'entraînait vers le fond, où il disparut. Toutes les recherches effectuées restèrent vaines; on découvrit, à la rive et à faible distance de là, les traces d'un énorme serpent d'eau qui avait rampé à travers les herbes d'une lagune voisine vers le Curaray.

Au Rio Putumayo, des professionnels que j'allais voir pêcher le pirarucu me désignèrent un bras d'eau, canal naturel menant à une lagune proche que les arbres nous cachaient. Ils la savaient, me dirent-ils, hantée par un de ces énormes serpents d'eau; depuis, ils n'osaient plus s'y aventurer. Voici comment. Ces pêcheurs, des Indiens Cocamas, avaient pénétré peu de mois auparavant dans cette lagune pour y pêcher le pirarucu au harpon; ils naviguaient sans bruit dans leurs petites pirogues, lorsque soudain une énorme tête de serpent, plus large qu'une de leurs embarcations, émergea à quelques mètres à peine de l'un d'eux. Ce dernier put la regarder tout à son aise. Probablement le serpent n'avait-il pas faim, car il disparut. Plusieurs compagnons du pêcheur l'avaient vu également; tous se hâtèrent vers le rivage. A leur campement, ils réunirent leurs vêtements et leur matériel, puis, en hâte, ils abandonnèrent l'endroit.

Parfois, ajoutèrent-ils, on y entend mugir le vent dans les arbres et on croirait que l'orage sévit, alors que le ciel est parfaitement limpide. C'est le serpent d'eau qui chasse le caïman; et alors l'eau reste trouble durant plusieurs jours, tant la vase a été remuée par les allées et venues du monstre qui poursuit ses proies.

Parfois aussi, là ou en d'autres cochas, deux de ces boas se réunissent et se battent. La chose m'a été affirmée par des indigènes en diverses contrées, ainsi que dans le bassin de l'Orénoque. On dit alors que le serpent d'une certaine lagune est venu en combattre un autre.

De tous côtés, on entend parler de serpents monstrueux. Je ne parlerai pas ici de ces cas incroyables, qui m'ont été contés, comme véridiques par les natifs de ces régions, au cours de mes voyages; je veux simplement rapporter quelques incidents que j'ai vécus ou que j'ai pu vérifier.

Qu'il existe de grands serpents, cela ne fait aucun doute; les plus grands que, personnellement, j'ai pu voir, atteignaient dix à onze mètres. Peut-être en existe-t-il même de plus grands? Qu'il me soit permis de signaler, à ce sujet, un simple incident qui, par la façon dont les Indiens le considèrent, démontrerait qu'ils en voient en effet d'énormes. En compagnie de quelques Indiens Piapocos, je remontais le ruisseau Cara-cara, sous-affluent du Rio Guaviare. Déjà nous approchions de la limite accessible aux pirogues, lorsque mes hommes attirèrent tout à coup mon attention. De la main, ils indiquaient la rive droite, en disant : « Voyez le serpent ».

Afin d'éviter le danger de passer directement à sa portée, ils obliquèrent vers la rive opposée. Le corps du reptile était enroulé autour d'une branche maîtresse d'un arbre surplombant le courant. Arrivé à hauteur de la bête, je saisis ma carabine et visai l'animal juste derrière la tête, de façon à lui briser l'épine dorsale vers la nuque. Au coup de fusil rien ne bougea; la tête seulement sembla s'affaisser quelque peu; mais, au bout d'un instant, le corps parut se détendre et perdre l'équilibre. L'animal atteint glissa, tomba à l'eau. J'ordonnai à mes rameurs de se diriger vers cet endroit et, comme l'eau était cristalline, nous pûmes voir le serpent, remuant légèrement à un mètre de profondeur environ. J'aurais bien voulu le prendre pour le dépecer ensuite, mais l'opération n'était guère facile et l'Indien qui pilotait à l'arrière me prévint. « Comment voulez-vous que nous puissions le faire? Il est encore vivant et n'aura perdu toute vie qu'après une demi-journée peut-être. Si nous cherchons à le capturer en ce moment, ou si nous nous y prenons mal, nous risquons de le voir s'enrouler autour du corps de l'un de nous, pour le broyer comme un brin d'herbe. D'ailleurs, que voulez-vous faire de la peau de ce vilain animal? »

Un instant après, poursuivant son idée sans doute, le pilote ajouta encore : « Pourquoi avez-vous tiré et gaspillé ainsi votre poudre? — Je le désirais, il est grand. — Grand? Non; si vous voulez : de taille moyenne, plutôt petit même. — Il mesure assurément huit mètres; je sais qu'il peut y en avoir de plus grands, n'empêche qu'il est déjà de belle taille. — Mais non, pas du tout. Quoiqu'il soit déjà capable de dévorer un homme, il est encore petit, comparé aux serpents que nous rencontrons parfois. Au Rio Guaviare, principalement dans certaines lagunes de ses environs, et même vers le confluent de ce ruisseau, on en voit souvent, lors des crues, qui sont plus du double du serpent que vous venez de tirer. Leur grosseur dépasse souvent la largeur de notre pirogue. »

Ainsi amenés à parler de ces serpents, les Indiens me signalèrent des cas de rencontres avec de vrais monstres. Lors d'une crue, pour se rendre directement au Rio Guaviare, de leur case située bien en amont de l'embouchure du Rio Uva, des Indiens Piapocos voulurent, me dirent-ils, profiter des raccourcis que constituent les marécages et les lagunes. Alors qu'ils venaient de franchir un de ces petits lacs, ils entendirent derrière eux comme le bruit du tonnerre; or, le ciel était limpide et il n'y avait pas de vent. Ils virent cependant la surface du lac s'agiter; des vagues même battirent le rivage où ils venaient d'aborder. C'était donc un animal qui chassait entre deux eaux. Un moment, ils purent apercevoir une tête monstrueuse de serpent. Le reptile nagea un instant à la surface, puis plongea. Si leur pirogue s'était trouvée sur la lagune, ils eussent probablement été dévorés; ils auraient en tous cas chaviré. Ils avouèrent que jamais plus ils ne se risqueraient par là. Il n'est pas impossible que dans ces régions, à l'époque des crues, lorsque l'on chasse ou que l'on pêche dans le voisinage des lagunes, l'on voie apparaître quelque monstre. Parfois, on l'entend de loin. On croirait le bruit du tonnerre ou de la tempête dans les arbres. En réalité, c'est le bruit du combat entre deux énormes serpents.

Ce n'est pas seulement du côté de l'Amazone, mais également dans le bassin de l'Orénoque, vers le Guaviare surtout, que l'on entend parler de serpents gigantesques. Les boas d'eau n'ont pas besoin d'avoir ces tailles fantastiques pour être dangereux pour l'homme; un serpent de six ou sept mètres peut facilement faire une victime.

A la dernière habitation de civilisé, en amont du fleuve Orénoque, je fis arrêter, pour permettre quelques ultimes préparatifs avant de pousser mon exploration dans la région absolument sauvage. Tandis que mes hommes étaient occupés, je décidai d'aller, en compagnie de quelques Indiens Maquiritaris, vers leurs villages situés au bord du Caño, ruisseau coulant un peut en amont.

Nous avions navigué durant une couple d'heures et nous allions arriver devant une de leurs cases, lorsque le pilote, m'indiquant l'eau, face à la proue de la pirogue, me dit : « C'est là que le serpent a saisi un de nos compagnons. C'est là qu'il fut pris et qu'il disparut à jamais. Ne vous l'a-t-on pas raconté? » J'ignorais la chose et je demandai des explications. Déjà nous avions abordé. Étendant le bras dans cette direction, qu'il regardait fixement, l'Indien reprit.

« C'est là que Grégorio plongea pour ne plus reparaître. Il y a presque trois lunes de cela. Nous revenions du travail; une pirogue avait déjà abordé et Grégorio, debout dans la sienne, s'apprêtait à descendre à terre, lorsqu'un faux mouvement lui fit lâcher son couteau qui tomba si malencontreusement qu'il rebondit dans l'eau. Sans hésiter, il enleva sa chemise et plongea. L'eau n'était guère profonde. Elle n'atteint pas trois mètres à cet endroit, alors que plus au centre, des poches ont près de dix mètres de profondeur. Excellent nageur, notre parent n'aurait pas hésité à plonger, même aux endroits les plus profonds, et pourtant il ne remonta pas. Tout ce que nous pûmes voir, ce fut une traînée de bulles d'air vers le large. En vain, nous avons attendu depuis, et même sondé partout.

« Or, vous vous rendez compte de ce qu'il n'y a ici aucun courant; dès lors, s'il s'était noyé, son cadavre aurait dû forcément remonter à la surface et s'accrocher éventuellement aux branchages de la rive, plus en aval. Mais rien!

— Ne croyez-vous pas qu'il ait pu rencontrer des racines en plongeant et qu'il ne soit pas parvenu à s'en dépêtrer? — Non, car nous avons sondé partout dans les environs et aucune branche, aucun tronc d'arbre ne s'y trouve. Notre sorcier nous a dit que Grégorio est simplement parti faire un voyage parmi les esprits et qu'il reviendra, mais beaucoup plus tard.

— Votre sorcier a dit cela? — Oui, ajouta l'Indien l'air sceptique, il l'a dit, mais depuis tant d'années que nous travaillons pour le Señor Nogueira, notre patron, nous ne croyons plus guère le sorcier, ni à toutes ses histoires de divinités quelconques, assez peu même aux esprits de la forêt et des rivières; il nous semble plutôt que sa mort est bien naturelle et, sans chercher plus loin, nous admettons que c'est le serpent qui habite ces trous d'eau qui a dû le saisir.

— Y a-t-il donc un grand serpent par là? — Oui, nous l'avons vu une fois ou deux — N'est-ce pas un peu d'imagination ou de crainte de votre part? — Non. D'ailleurs, un peu en amont d'ici et avant d'arriver à l'autre case, vous verrez certainement un serpent que nous avons tué il y a deux jours et dont le cadavre est resté accroché à une branche maîtresse à demi submergée, à moins que les vautours ou les poissons voraces ne l'aient déjà dévoré ».

En effet, nous vîmes le cadavre du reptile, déjà en décomposition. L'animal n'était guère que de la grosseur de la cuisse d'un homme et mesurait sept mètres environ. Pouvait-il donc avoir été aussi dangereux que ces Indiens le disaient? Je tins à apprendre d'autres détails.

Le pilote m'expliqua comme suit ce qui s'était passé. « Une des femmes de la case était allée puiser de l'eau à la rivière. Elle remplissait son amphore lorsque, tout à coup, la tête du serpent émergea à moins de trois mètres. Elle poussa des cris et se sauva en toute hâte vers la case, distante comme vous verrez, d'une cinquantaine de mètres de la rivière. Mis en alerte par ces cris, les hommes saisirent leurs armes, croyant avoir à se défendre contre une attaque de nos ennemis, les Guaharibos sauvages. Ils s'aperçurent vite de leur erreur et comprirent qu'une bête menaçait la femme. En effet, le serpent était sorti de l'eau et poursuivait très rapidement la malheureuse, affolée. Les hommes lui décochèrent leurs flèches, l'assommèrent à coups de gourdins et le tuèrent. Jeté ensuite à l'eau, le reptile avait été emporté par le courant, jusqu'aux branches où nous venons de le voir. »

Il devait être de bien plus belle taille, le serpent qui a entraîné un bœuf, dans le Rio Putumayo, la veille de mon arrivée sur les lieux de l'événement. J'y trouvai les gens tout impressionnés encore de ce qui s'était passé.

Comme on embarquait quelques bœufs à bord d'un chaland, l'un d'eux tomba à l'eau; il poussa soudain un long beuglement de désespoir. Le fort lasso qui le retenait se tendit anormalement et se brisa net, tandis que l'animal disparaissait à jamais. Seule une traînée vers le large permit de suivre un instant la direction qu'il avait prise.

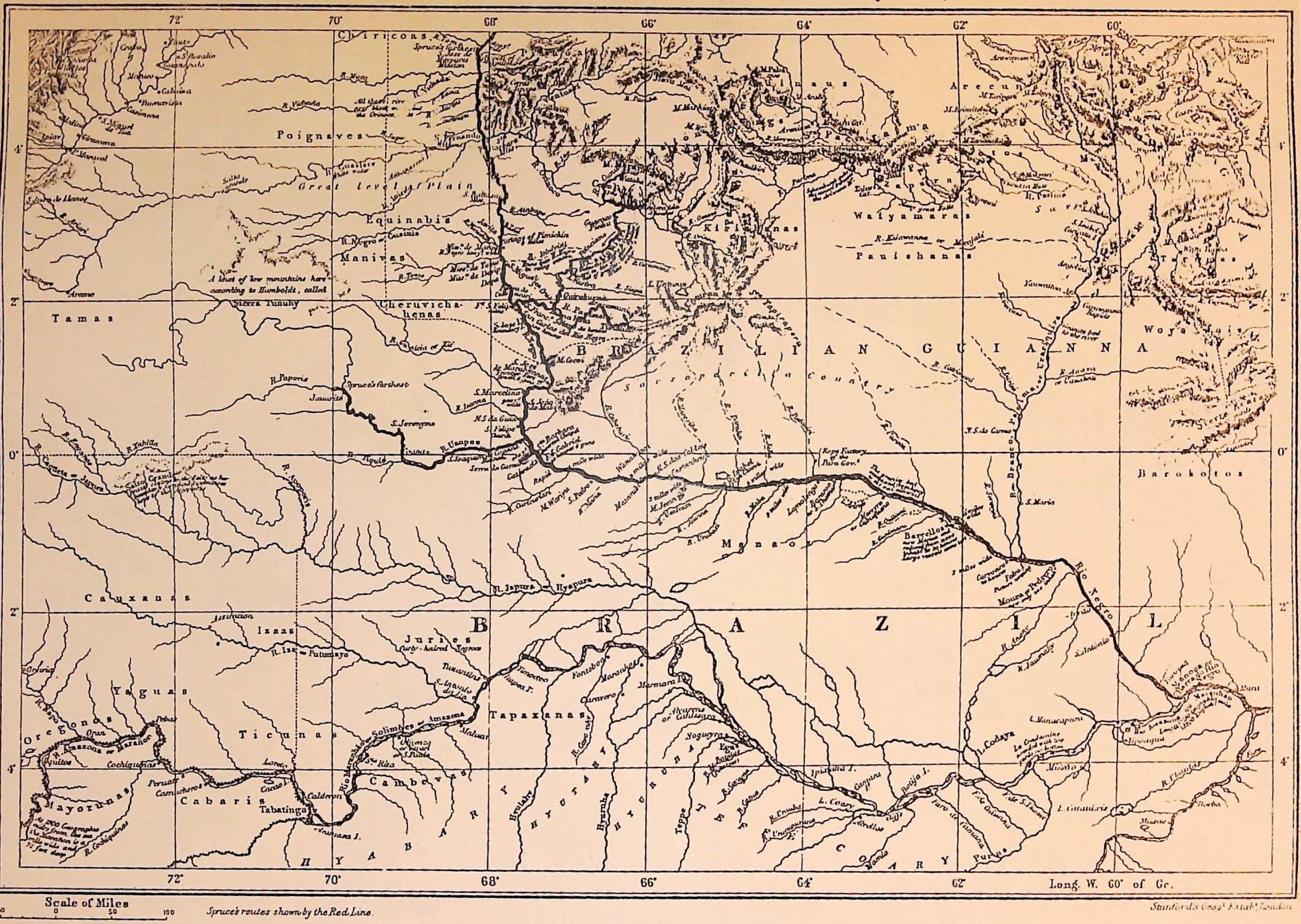
On réussit quelquefois à capturer un de ces serpents de taille relativement petite. C'est ainsi que nous en voyons des spécimens dans certains Zoos. Mais même après une longue captivité et bien qu'il ait été pris assez jeune, il ne se familiarise guère. Jamais on ne peut se fier à lui comme au boa constrictor. Lorsque celui-ci est familier, on peut le toucher, le prendre même brusquement; il aime à être caressé. Le serpent d'eau, au contraire, est toujours plus ou moins sauvage et prêt à mordre.

Lorsqu'ils ont l'occasion d'en tuer un, la plupart des Indiens sauvages le mangent. Ils apprécient surtout le boa constrictor, quoique certains ne dédaignent pas le serpent d'eau, lorsqu'il n'est pas trop grand. La chair de ces animaux rappelle, paraît-il, le goût de l'anguille.

Caïmans. — Dans l'introduction de cet ouvrage, nous avons parlé de l'aire d'habitat du caïman. Nous jugeons inutile de décrire ici cet animal; qu'il nous suffise de dire qu'il atteint facilement cinq et six mètres.

On connaît assez le caïman, d'après les gravures tout au moins, pour savoir qu'il est armé de dents nombreuses et de dimensions diverses, mais toutes canines. Ce que l'on

MAP SHOWING SPRUCE'S ROUTES ON THE RIO NEGRO, UAUPÉS, CASIQUIARI, AND ORINOCO.



Spruce's routes shown by the Red Line.

Stanford's Geog! Estab! London

London: Macmillan & Co., Ltd.

Notes of a Botanist on the
Amazon + Andes
by Richard Spruce
Volume I - © 1908
reprinted Johnson Reprint Corp -
1970

London: Macmillan & Co., Ltd.

Chapter XII

largest specimen exhibited in a zoo was twenty-six feet long, and this was a very large snake.

The anaconda is really a water snake and is frequently seen drifting lazily along with the river currents. It is found in the river valleys of northern South America. It is both an adept swimmer and a good climber. While not essentially arboreal, it climbs about in trees near the water and specimens have often been observed diving into the stream at the approach of man.

The markings of the anaconda consist of black rings and spots on an olive-green ground. There are four other species, *E. gigas*, *E. barbouri*, *E. deschauenseei*, and *E. notæa*.

The snakes belonging to the genera *Boa* and *Epicrates*, are among the smaller New World tree boas. They are agile climbers, usually beautifully colored, and have extremely bad tempers. Although non-poisonous, they possess long teeth that in full-grown specimens rival in length the fangs of the vipers, apparently an adaptation developed by their bird-feeding habits. Tree frogs, lizards and small mammals also form part of the diet.

One of the most beautiful of the boas is *Boa canina*, the dog-headed boa or parrot snake, a native of northern South America. The adult is of a beautiful yellow-green color, with narrow white crossbands at long intervals along the back, the under side, chin and upper lip being yellow. The young are brick-red with a slightly discernible pattern of darker bands. As is frequently the case with arboreal animals, there is a lateral compression of the body. The similarity in color of the New Guinea python (*Chondropython viridis*) occurs not only in the adult, but also in the young and juveniles. Such parallelism is impossible to explain in view of the very wide geographical separation of the two forms, although similarity in color is fairly common between closely related animals which inhabit the same general region. A rather large number of African flies belonging to different families have the same color pattern, and this is also true of some tropical American butterflies. Authorities on these groups can

tell where the specimen came from without looking at the locality label.

The parrot snake does not necessarily feed altogether upon parrots, and it is doubtful if these birds furnish more than a very small part of its diet, but they are a menace to small monkeys. They grow to a length of six feet or more, but so well do they fit into their surroundings that the first intimation of their presence is generally the scream of a monkey that has been suddenly grasped in the strong jaws of the snake. The monkeys live in deadly fear of them, and the discovery of one in a tree changes the happy chatter of a band to screams of terror as they scatter in all directions to escape.

Epicrates cenchria is another of the beautiful snakes found in the American tropics. It is known as the rainbow boa because it has bluish rings on a red background and a peculiar bluish opalescence which covers the whole and gives the color pattern an unusually hazy appearance. This opalescence, it seems likely, is due to the reflection of ultraviolet light, as in the case of the colors of the morpho butterflies found in the same regions.

In the United States there are only two representatives of this family. Both are found in the southwest. They are known as *Lichanura roseofusca* (the rosy boa) and *Charina bottae* (the rubber boa). They are small, dull colored snakes, seldom exceeding three feet in length, and so lack the grace of their tropical relatives that the casual observer would scarcely connect them in his mind. Their secretive habits are very much like those of the Old World sand boas belonging to the genus *Eryx*. They have the habit, common to many of their relatives, of rolling themselves into a ball when disturbed, so that they may be rolled about, relaxing only when danger is apparently past. Their bite would be, of course, entirely harmless as their teeth are solid, but so intent are they upon escape that it is all but impossible to induce them to strike.

Mr. Dwight W. Pearce has related to us his observations of a

Snakes and their ways Co 1937 by Harper & Brothers - N.Y. printed in U.S.
second edition by Charles Howard Curran - Dept of Entomology - American Museum of Natural
History and Carl Kauffeld - curator of reptiles Staten Island - Zoological Society

anaconda. His assistants dragged the snake on to the riverbank and measured it with a surveyor's tape at 37 feet, 6 inches. The party then broke for lunch. On returning to photograph and skin the snake, they discovered it had gone. Presumably it had been merely wounded, and had managed to return to the river. Professor Dunn reported to Dr Oliver that Lamon's veracity "was beyond question."

But another reliable source once reported an even larger anaconda: Brazilian army general Candido Mariano de Silva Rondon, a well-known naturalist and explorer who had accompanied Teddy Roosevelt on his 1913 Brazilian expedition. He reported that, on one of his own explorations, he examined an anaconda, killed by Indians, that measured 38 feet.

By the late 1940s, Brazilian herpetologist Afranio do Amaral, director of Sao Paulo's famous Butantan snake institute, concluded that some anacondas reached a length of between 39 and 42 feet. He based this conclusion mainly on his own interviews with witnesses.

It is therefore not unreasonable to accept the proposition that some anacondas may reach 40 feet and perhaps more. But what about Col Fawcett's 1907 report of a 62ft specimen? How reliable is that?

Fawcett had been seconded by the War Office to the Royal Geographical Society, which sent him to the Amazon to undertake boundary delimitation work because of a territorial dispute between Bolivia and Brazil. After his three-year official duties ended, he returned to South America to conduct his own expeditions, and except for returning to England to serve on the Western Front in the First World War, he spent most of the next 15 years exploring the Brazilian Amazon.

Fawcett was a tough individual, and his adventures often read like those of a comic-book hero. In 1925, he disappeared into the Brazilian interior again, this time with his older son, on a two-year expedition in search of a legendary 'lost city' left by a supposedly extinct Amazon civilisation. He was never to be heard from again.

The reliability of Fawcett's giant anaconda account has often been questioned because of his eccentric obsession with a lost city. But apart from the fact that recent archaeological evidence now supports Fawcett's Amazon civilisation theory, he was very meticulous in all the observations he entered in his journal (which was published as a book in 1953 by his surviving son, as *Exploration Fawcett* in the UK, and as *Lost Trails, Lost Cities* in the United States).

But there is a problem with Fawcett's report. Is such a big snake physically possible? Intense biomechanical and physiological stresses are imposed on a large snake moving over land, and the larger the snake, the more severe the stresses. The thinking among some herpetologists seems to be that the upper length limit for a snake on land is probably about 50 feet. If an anaconda were much longer (and thus bulkier) than that, it would almost certainly have to spend nearly all of its time in the water (which would buoy up its weight). But then Fawcett had written that, when the 62ft anaconda was shot, it was *leaving* the water.

Did Fawcett purposely exaggerate the snake's length? Or was he correct, and our biomechanical estimates wrong? We'll probably never know for sure. But one day we might know if there are such things as 40 or 50ft anacondas. ■

Author

Richard Greenwell is secretary of the International Society of Cryptozoology (PO Box 43070, Tucson, Arizona 85733, USA), which is devoted to the study of animal enigmas.

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BBC Wildlife, 11 (nº 4), April 1993

ANIMAL ENIGMAS

Big snake stories

A 62ft-long anaconda? That's a pretty long snake, but Col Fawcett claimed to have seen and shot one in Brazil in 1907. The trouble is, he didn't bring it back with him, and so the longest confirmed anaconda – the longest snake in the world – is still about 30 feet. *J Richard Greenwell* looks at this and other explorers' reports and weighs up the likelihood of any or all of them being whoppers.

In 1907, Lt Col Percy Fawcett of the Royal Artillery was surveying a remote area of the Brazilian Amazon. While many parts of the Amazon remain hardly explored today, the world's largest tropical basin – 2.7 million square miles – was still almost completely unknown to Westerners at that time, and Fawcett was one of its first modern explorers.

One day, while he was navigating the Abunã River near its confluence with the Rio Negro, a large anaconda *Eunectes murinus* surfaced near his dugout canoe, causing panic among his Indian crew. Fawcett reportedly shot the snake as it made its way up the riverbank to escape. "As far as it was possible to measure, a length of 45 feet lay out of the water, and 17 feet in it, making a total length of 62 feet." That is more than double the maximum length of 30 feet that most herpetologists allow the anaconda.

Three years later, Algot Lange claimed to have shot an anaconda measuring 56 feet in the Jivari River, in the Peruvian Amazon. And in 1927, explorer F W Up de Graff reported in his book *Head-hunters of the Amazon* that he had observed an anaconda "50 feet for a certainty, and probably nearer 60 feet."

Such accounts of giant anacondas have always been common in the Amazon, as I myself can testify from the six years I spent in South America. Indeed, giant snake stories have always had a grip on people's imaginations, and it was no surprise when, in 1910, former US President Theodore Roosevelt – an avid naturalist – offered a $1,000 reward for any snake measuring 30 feet or more. The offer was made through the auspices of the New York Zoological Society (overseer of the Bronx Zoo), which has increased the reward several times over the decades. Today, it stands uncollected at $50,000.

Is there any truth to such giant anaconda stories? While most herpetologists are highly sceptical, there are a number of reliable reports of anacondas measuring more than 30 feet. There are some anaconda skins, too, that are longer than 30 feet, but skins stretch about 20 per cent on removal, and intentional stretching can add 30 per cent to the length. Unverified reports of giant African and Asian pythons are also interesting and common, but beside the point – which is the likelihood of anacondas longer than 30 feet.

Another early 30ft-plus anaconda record dates from 1921, when Vincent Roth, director of the British Guiana (now Guyana) Museum, reported shooting a 34ft anaconda in the Barima River. In 1924, R R Mole recorded a 33ft specimen having been killed in Trinidad, but no further details were given. In the 1950s, Frederico Medem, of Colombia's National University, reported to James A Oliver, then curator of reptiles at the Bronx Zoo, that in 1956 a large anaconda had been killed in the Guaviare River, and was accurately measured at 33 feet, 8 inches. Medem also informed Oliver that he had once personally observed an enormous anaconda that must have measured between 30 and 40 feet. Medem was a professional herpetologist, and so his report must be treated with some respect.

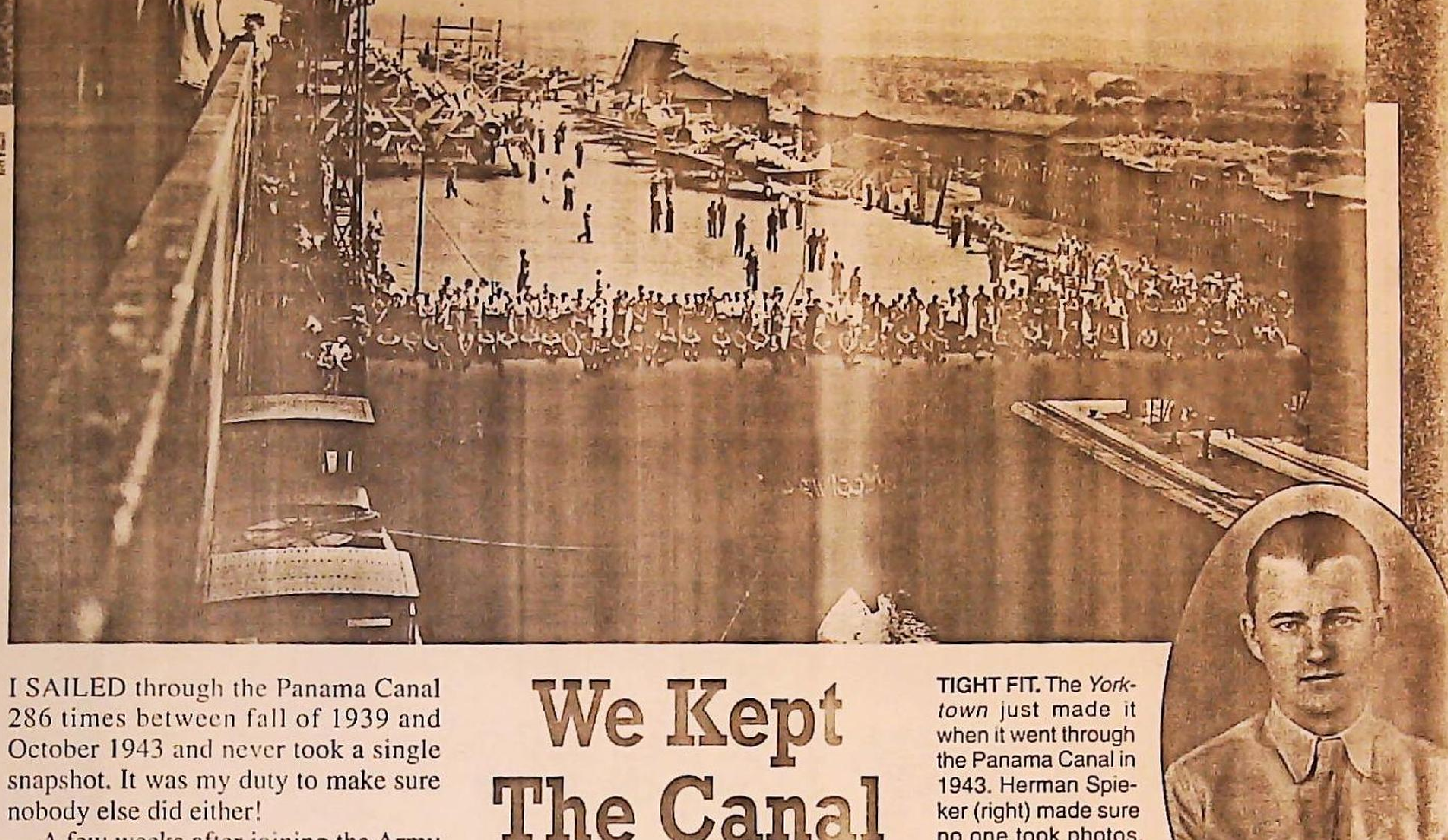
But it was another report, also from Colombia, that impressed Dr Oliver the most, and that was an account published in 1944 by Harvard University herpetologist Emmett R Dunn. On a trip up the northern Orinoco River, Dunn's friend Roberto Lamon, a petroleum geologist, shot a gigantic ▶

International Society of Cryptozoology/New York Zoological Society

Tiddler. This anaconda, held by seven men at Bronx Zoo nearly 100 years ago, was only 19 feet long. Col Fawcett's was supposed to have been three times that. Confirmed records for this constrictor, the largest snake in the world, are around 30 feet.

Record-beating reptiles

- The largest crocodilian is the saltwater crocodile *Crocodylus porosus* (India to Australia), with a maximum recorded length of about 20 feet, and reports of individuals up to 33 feet.
- The largest lizard is the Komodo dragon monitor lizard *Varanus komodoensis* (Indonesia), with a maximum recorded length of about 10 feet and reports of individuals of up to 16 feet. The Papuan monitor *Varanus salvadorii* is thought to be longer (lengths of up to 20 feet have been claimed), but is more slender.
- The largest chelonian (turtle or tortoise) is the marine leatherback turtle *Dermochelys coriacea*, which clocks in at a maximum length of 9 feet, 5 inches, with a weight of 2,016lb. In 1962, a British trawler reported a 12ft monster.



TIGHT FIT. The *Yorktown* just made it when it went through the Panama Canal in 1943. Herman Spieker (right) made sure no one took photos.

We Kept The Canal Photo-Free

Making the Panama Canal safe from saboteurs during WWII was interesting duty—especially when you got to sing with Al Jolson!

By Herman Spieker, Bremerton Washington, as told to Jane Edwards

I SAILED through the Panama Canal 286 times between fall of 1939 and October 1943 and never took a single snapshot. It was my duty to make sure nobody else did either!

A few weeks after joining the Army on my 18th birthday, I found myself on a ship headed for Panama. Because I spoke fluent German, I'd been assigned to military intelligence.

Back then, anything to do with the canal was considered a military secret—we couldn't risk letting an enemy get too close a look at those strategic installations.

No matter what nation's flag a ship flew, the vessel wasn't allowed through the canal without a military escort aboard. And, of course, there was a dire need for interpreters.

I was part of a 12-man team that went aboard at Colon, the canal's Atlantic Ocean entrance. We made sure the firing pins were removed from every weapon on the ship, and we kept them under guard for the 6 to 9 hours it took to make it through.

He Hunted Shutterbugs

I had the run of the ship and carried a sidearm. It was my job to roam around, keep my eyes open and make sure nobody took any pictures. Once we reached the Pacific, we stayed overnight in the barracks at Balboa, then escorted another ship back the next day.

One day in particular was memorable: December 6, 1941. I was standing guard at the Gatun Locks when a Japanese ship entered the bay and asked permission to go through.

It was routine to radio the port captain and relay the request. His reply was anything but routine.

"I've got strict orders not to let that ship through," he barked. "Tell them a tug will be along shortly to pull them back out to the Atlantic."

The port captain's word was law, and the Japanese officers knew better than to argue. The next day, we heard about the attack on Pearl Harbor.

On our days off, there was plenty to do. I liked fishing on the Chagres River and once caught a 165-pound tarpon. Some days we'd take a machete and hack a path through the jungle behind the barracks. In no time, we'd fill a sack with bananas, coconuts or papayas.

Fruit wasn't the only wild thing in the jungle. One day an angry wild boar charged my buddy and me and kept us treed for hours. A few days later, I was driving up from the docks in a truck loaded with 700 cases of Pet milk when I ran over a 32-foot-long boa constrictor!

A highlight of my days at the canal was late in 1942 when Al Jolson arrived with a USO troupe. Before they arrived, a buddy and I had written a parody to *The Darktown Strutters' Ball*. It contained some silly lyrics about having the colonel mop our floor and the topkick shine our shoes when we got back home to the good old USA.

Song Hit a Sour Note

I showed the song to Al Jolson and asked if he'd sing it. "Sure," he said. "Let's make it a duet."

So I got up on the stage and sang the song with Al Jolson. The audience loved it—all but General Andrews, that is!

The next day, the general called me in and said if he ever heard that ditty on his base again, I'd be kicked out of the Army. That was the end of my show business career.

Although taking snapshots was taboo back then, I don't need a photo album to remind me of my experiences at the Panama Canal. The memories are still as bright as the sun beating down on the steamy jungle where it all happened. ✪

Reminescene Magazine 1998 – 1993

LETTERS

Continued from page 45

THE LONGEST SNAKE

In 1910, explorer Algot Lange, while traveling in northwest Brazil, shot and killed a 58-foot boa constrictor with a circumference of 5 feet 8 inches.

Lange's account was published in 1911 by the *New York Herald* and included a photograph of the snake. However, there is no measurable object in the picture that would help confirm the snake's length.

Though there were four printed references to this incident at that time, it has not been mentioned again in 70 years.

Gary Mangiacopra
Milford, CT

Although I can't offer evidence of a "record" snake for your fascinating search, nevertheless I can't accept Brian Polsley's "photographic evidence" of the 30-foot python printed in the September 1981 Letters section.

The photo is evidence only that the python is longer than 17 feet. Note that the python extends across the equivalent of 10 men standing shoulder to shoulder. . . . Allowing a generous 1.66-foot width per man, the snake is nowhere near 30 feet in length.

Cdr. K.A. Lee
U.S.S. *Gato*
U.S. Navy

BILLIONS?

You quote Niles Eldredge of the Museum of Natural History as follows: "Our theory is based on the observation that new species seem to appear suddenly and then hang on for five to ten billion years without change. . . ." ["Challenging Darwin" with the main article, "Evolution: Selection for Perfection," December 1981.]

Can you name just one living species that ever hung on for five, let alone ten, *billion* years?

Ernest Franke
Annandale, VA

Our thanks go to Mr. Franke for pointing out our typographical error. Of course, Niles Eldredge, Ph.D. in geology, said "five to ten million *years."–Ed.*

THE CHALLENGE

The pull of gravity on mudskippers is *not* stronger on earth than it is in water [Challenge, November 1981]. Gravity is merely opposed by a buoyant force in water, such that the *net force* experienced is smaller in water.

Dennis Chitwood
Medford, OR

TROBRIAND

Continued from page 105

forage on the shore for shellfish, cook and carry the water, while men fish and hunt, build canoes and make trading expeditions. Men build the framework of houses and women do the thatching. In addition, there is a strict division of possessions in each household. Husband and wife each own and care for their own personal belongings, including clothing. Weiner reports that most marriages are stable, although divorces do occur. The wife returns to the village in which she was born, but the marriage is far from over. Should the woman marry again, however, her new husband must give a gift to her first husband. At this point, her divorce is considered complete.

EXCHANGE RITUALS

Once married, the husband begins to participate in a ritualized exchange of gifts with his wife's lineage. Presents of yams, fish, vegetables, ax blades, shells and necklaces pass back and forth.

Most of a married man's yam harvest goes to others, in a set of complicated ritual exchanges. In return, he receives yams from his wife's family and from his own clan. Fathers and brothers give yams, and husbands receive them. A married man gives most of his yams to his sister's family and receives most of his yams from his wife's clan brothers. In return for what her family gives the husband, a wife receives from him what is known as "women's wealth," skirts, calico cloth and banana-leaf bundles used in mortuary rituals.

Payment and repayment is the focus of Trobriand marriage, a contract not simply between two individuals but rather between two lineages. The relationship ends at death and is marked by the funeral rites, by the widow's or widower's mourning ceremonies and by huge feasts, called *sagali,* presented by the dead man's clan as repayment for the burial services provided by the widow and her family. *Sagali* are undertaken by both the women and the men of the dead man's clan as repayment for those who helped with the burial service or were especially kind to the deceased during life. Men compete to accumulate yams, pigs and valuables to give away, the one who gives away the most gains the most glory. Women, too, compete, making an enormous number of banana-leaf bundles and colorful fiber skirts to be given away.

At these rites, the spirit of the dead man is considered already departed and living its happy afterlife. The funeral is best understood as the conclusion of marriage, the occasion for final settling of accounts between lineages. It is also an opportunity for the living to gain new and greater honors for themselves in the ever continuing cycle of ritual exchange. ■

BRAIN SWAPPING

Continued from page 81

the everyday or even the legal sense of establishing truth. Possibly, according to the pragmatist's test, for hologramic theory works. But as the logician tests truth, my answer is, I hope not.

I am still unwilling to declare hologramic theory *true*. Do I believe the theory? Yes, of course, or I wouldn't be writing about it. But belief has an irrational component built in. And if I correctly judge the reader by my own feelings, there's too much π in the abstract sky for us to move directly from hologramic theory to a description of mind that will ring true to our intuitions. Let's imagine an experiment.

Let's reach into the distant technological future and invent a new holography. Let's invent a hologram of a play, but one whose reconstructed characters are life-size, full color, warm, moving and endowed with "holophonic" sound.

Now let's enter the theater while the play is in progress with the mission of finding out whether the actors are at work or whether they've taken the night off and are letting their holograms carry the show. What test can we use? Suppose we sent a 515-pound gorilla up to the stage. What would live actors do? We could never specifically predict. But there would be a change in their behavior.

What about the holographic images? We can accurately predict their responses with a single word: *nothing!* With the holographer on the job, the show will go on.

What's the theoretical difference between our live players and their holograms? Both depend upon the same basic abstract principle—relative phase. Yet the informational universe in our physical hologram is like a cake that has already been baked. If we want the gorilla in the scene, we must make up our minds about that during construction—before the abstract dough congeals in the theoretical oven. The hologram's coordinate system has already been defined; it is what the philosopher would call *determinate.*

UNDEFINED UNIVERSE

Our live players? Their informational universe is still being calculated; it is still fluid. Their coordinates are not yet defined. Our live actors' minds are continuously *indeterminate.* And it is this *indeterminacy* that *is the principal feature of intelligence!*

Should holographers somehow give holograms continuous indeterminacy, it won't make any difference whether we perceive a particular person or a hologram of him or her—*except* to that person. For then holograms would be as unpredictable as we are. My hunch on this is that it will always make a difference whether we see a person or a holographic reconstruction—but that's pure hunch. ■

MAGAZINE: SCIENCE DIGEST
DATE: FEBRUARY 1982

LETTERS

Continued from page 9

INTIMATE FRONTIER

To the Editors: I am impressed with your entire magazine but especially the article "The Intimate Frontier" by Jerome Burne [March 1981]. You have fostered my hopes for improved surgery, not only for future generations but possibly even for my own.

Jeannie Shrake
Hoover, AL

STAR OF ENLIGHTENMENT

To the Editors: In regard to your article "The Star of Enlightenment" by Patrick Huyghe [reporting on George Michanowsky's discoveries, March 1981]: Fruitless guesses about stellar inspirations to write can only mislead your readers into thinking that precious little is known about the origins of the written word.

Professor Denise Schmandt-Besserat has made a strong case for the development of writing in Mesopotamia from small commercial tokens, which were in use between 8,000 and 11,000 years ago. These tokens have been found from Iran to Turkey and bear close resemblance to the various numerical signs found later in Mesopotamian cuneiform writing (beginning the 6th century B.C.).

David N. Wigtil, Ph.D.
Department of Classics
Concordia College
Moorehead, MN

Science Digest *asked George Michanowsky, Science Advisory Board member of the Explorers Club, for a brief reply:*

Let me state that my own awareness of the work of Ms. Schmandt-Besserat well antedates Wigtil's by a number of years. And in that connection, I must emphasize that mere mnemonic devices—memory aids such as knots in handkerchiefs—are not a true form of writing and, it must be noted, will not necessarily develop into a full-fledged script just by themselves. As archeologist Dr. Joan Oates stated, the clay tokens cited by Schmandt-Besserat may not have advanced beyond a "method of accounting" for illiterates.

Lately, and seemingly unbeknownst to Wigtil, Schmandt-Besserat has begun to look for more viable evidence to support her still-unproven claims by concentrating on material actually dating from 4000 B.C. Such a step, of course, is bringing her research down to precisely the time frame that my book The Once and Future Star *linked with a quantum jump in human achievement, triggered by the very close Vela supernova of about 4000 B.C.*

DARWIN AND THE MACHINE

To the Editors: Eric Mankin's "Darwin and the Machine" [Speculations, April 1981] was completely anticipated by Samuel Butler in his great satire *Erewhon* (1872).

Alan Barksdale

RITUAL AND DECEIT

To the Editors: I found your article "Ritual and Deceit" [Mary Long, Nov/Dec 1980] very interesting. I was amazed to find out about how much control the R-complex has over our behavior. I am only 12 years old, yet I am very interested in the brain and its functions.

In the article, Dr. MacLean says that most people would prefer to forget our reptilian ancestors. I personally like the idea that we are not as far away from animals as we are told! After all, what are we except highly evolved apes? (At least that's what I think.)

Ian Raum
Golden, CO

ANCESTORS

To the Editors: I was really fascinated by Boyce Rensberger's article "Ancestors: A Family Album" in your April 1981 issue. I can really see how primitive apelike creatures could have evolved into modern-day man. . . . Today, man is rapidly changing due to progress, and eventually he will evolve into a superior race of human. Thank you for the article; maybe someone else will benefit from it as much as I did.

Rick Baker
Fort McClellan, AL

A NEW RACE EMERGES

To the Editors: I thought that your Jan/Feb 1981 issue was most interesting. However, the article by Boyce Rensberger called "Racial Odyssey" displayed much muddled thinking. Although the accompanying photographs show quite clearly that there are pure races, the print section seems to deny this.

Also the author's obvious espousal of racial mixing is to my mind neither realistic nor desirable. There may well be certain fringe interface areas where racial mixing takes place, but to assume "a new race emerges" is just fanciful thinking.

J.P. Kennedy
Mississauga, Ont.

IMAGE THERAPY

To the Editors: I must commend you on your open-minded coverage of so many diverse topics. I was particularly intrigued by "Visions That Vanquish Cancer" in your April 1981 issue.

I can't help agreeing that the true significance of the placebo effect has been overlooked. When a nothing pill effectively alleviates headaches, warts and even tumors, we must ask ourselves what actually brought about the cure. I think we'll find that mental set, beliefs and feelings play an all-important role in the health or illness of any body.

Michele Redner
Peterborough, Ont.

SPLINTERING THE ATOM

To the Editors: In the March 1981 issue, William J. Kaufmann writes in his article "Splintering the Atom" as follows: "It has become clear the protons, electrons and neutrons are all composed of two still more basic particles called leptons and quarks."

This is indeed revelatory! Does the electron have a substructure too? I think Dr. Kaufmann is in error. The electron is a fundamental particle with no parts.

Arnold M. Gallub
Professor of Physics
City University of New York
New York, NY

We regret any confusion over our wording. An electron is a lepton; a proton and a neutron are each composed of three quarks.–Ed.

SATURN NEWS

To the Editors: Your item "Saturn News Not All New" [Update] in April 1981 is very interesting. I wonder if your readers might recall the passage from Arthur C. Clarke's novel *2001: A Space Odyssey*:

"But the glory of the rings continually drew Bowman's eye away from the planet; in their complexity of detail and delicacy of shading, they were a universe in themselves. In addition to the main gap between the inner and outer rings, there were at least fifty other subdivisions or boundaries, where there were distinct changes in the brightness of the planet's gigantic halo. It was as if Saturn were surrounded by scores of concentric hoops . . . all so flat that they might have been cut from the thinnest possible paper."

Bernard A. Hutchins
Ithaca, NY

MAGAZINE: SCIENCE DIGEST
DATE: AUGUST 1981
VOLUME 89 NUMBER 7

To the Editors: I wish Dr. Jastrow's column could be made required reading from first grade to high school and up to the President of the United States—for everyone in the Western world.

Louis I. Szathmary II, Ph.D.
Member, Board of Governors
National Space Institute

To the Editors: It is impossible to enumerate all of the benefits that we, as a society, have reaped from our efforts in space. Worldwide acclaim for the most advanced technology yet known is a product of the research and development of space-oriented hardware and software. The prestige of being the first to the moon, to land on Mars, and to photograph the rings of Saturn only supports, substantiates and applauds all that we represent to the world as a free and democratic society.

John Denver
Aspen, CO

ANCESTORS

To the Editors: I am a sixteen-year-old and enjoy reading your magazine very much. I especially liked your article on early man in the April 1981 issue ["Ancestors: A Family Album"]. There is one thing I do not understand, however, and that's why the early man shown on the cover has blue eyes. I know that blue eyes is a recessive trait and, therefore, not as common as brown or hazel.

Amy Wheeler
Virginia Beach, VA

Various scientists think that it is likely that Neanderthals living in northern climates had blue eyes, as light-colored eyes seem to be an evolutionary adaptation to the intensity of sunlight. The closer to the Equator one's group has evolved, the darker the eyes and skin.–Ed.

THE LONGEST SNAKE

To the Editors: In response to your note under the letters department of the March 1981 issue of a superb *Science Digest* magazine, I wish to contribute some information on "the longest snake."

In the marshy lands of Guyana, South America, it is common to see the anaconda or boa constrictor meandering through the swamps or coiled in a large heap on the ground or in a tree. They vary in length, reaching up to 36 feet. The reward for snakes is between $1 and $2, so there is a lack of interest in taking such a cumbersome thing to the local zoo.

Inderjeet Hiralall
Bronx, NY

To the Editors: In response to your inquiry on the world's longest snakes, I came upon some interesting information in Arthur C. Clarke's *Mysterious World*.

He states that the longest known living python is at the Knaresborough Zoo in Yorkshire, England. "Cassius" has, at last measurement, reached 27 feet.

Undocumented snakes are much longer. Even the 80-foot snake seen by Father Heinz and the 5-ton, 131-foot anaconda reported by the Pernambuco, Brazil, newspaper could be drafted by men's imaginations. . . . But with all the "extinct" or nonexistent animals that are discovered, who can be sure? If scientists have learned anything, it's that as soon as you say "always" or "never," nature supplies an example to make a liar out of you.

Joe Bornino
South Lake Tahoe, CA

Have you seen or heard about the "longest snake" in the United States or in the world? If so, please let us know.–Ed.

CREATION VS. EVOLUTION

To the Editors: My calculations reveal that 20 generations back, around 1321, I had exactly 1,048,576 grandparents who contributed to my genetic creation. If the calculation goes back 64 generations or about 2,000 years, I would have had 18,466,734,709,551,612 grandparents.

The last figure is obviously far too many people for that point in time.

Can you show me how to calculate my ancestry back to a single male and female to fit Darwin's Theory of Evolution?

Earl J. Nicholson
Elkins, WV

Isaac Asimov replies:

Inbreeding takes place. Go back 64 generations and you may have 18,466,734,709,551,612 grandparents, but these may include only 205 different *grandparents. The point is such a simple one that only a creationist would think it was a triumphant argument against evolution. Can someone calculate his ancestry back to Adam and Eve to make it fit the myth?*

HUMAN BEEHIVES

To the Editors: Cities like Paolo Soleri's Arcosanti ["Human Beehives," March 1981] represent an attempt to crystalize truly healthy environments around idealistic yet practical concepts. . . . These cities are a step in the evolution of the human species and may even be a deciding factor in our survival on this planet.

Michael D. Lipkan
Albuquerque, NM

SOLAR CELLS

To the Editors: Re: "Cells That Turn Sunlight Into Power" [May 1981]. . . . Solar cells now cost far too much. But there is a little-publicized sleeper that is just now breaking out in the form of plastic solar cells. There are over 200 known plastics which exhibit semiconductor characteristics. Of these, at least 50 are photovoltaic, ranging from the usual fraction of a volt to 200 volts for polystyrene.

There are persistent rumors that one of the chief motives among roofing manufacturers in retooling to produce fiberglass shingles is to develop production methods for fiberglass solar cells.

Edwin Austin
Orange, CA

TRAP FOR LIGHTNING

To the Editors: In your article on lightning arrestors, "A New Trap for Lightning" [Technology, Jan/Feb 1981], you state that Westinghouse developed the world's first gapless lightning arrestor and that it is capable of subduing up to 1,200,000 volts of electricity. Actually, I invented the world's first gapless lightning surge arrestor. It will easily subdue 10 times the voltage mentioned in your article and 100,000 amps as well.

My design is based on silicon dioxide rather than a metal oxide used in the Westinghouse device. Another important difference is that my arrestor is five inches high, weighing about one pound.

Mike Craddock
Delta Lightning Arrestors, Inc.
Big Spring, TX

THE SPARK OF LIFE

To the Editors: I tend to go along with Dr. Sidney Fox ["The Spark of Life," March 1981] and his followers that DNA is an evolutionary development of the cell and that it will keep developing. . . . I wonder if there are any specimens of the frozen Siberian mammoths still in existence so that a detailed analysis of their DNA could be made. It might shed some light on the question of how DNA evolved.

Dana Sheres
Stockton Springs, ME

Paul Johnson and Morris Goodman, chemists at Wayne State University, are currently analyzing the DNA of three mammoths. Because mammoth DNA is similar to elephant DNA, they plan to recombine the DNA from both species to determine compatibility.–Ed.

Continued

MAGAZINE: SCIENCE DIGEST
DATE: AUGUST 1981
VOLUME 89 NUMBER 7

MIND-READING MACHINES

After reading "Machines That Read Minds" [October 1981], I wondered how long it would be before we can play music with our minds. Surely when a specific tone is produced in one's mind, a corresponding electric pattern is also present.

If the patterns associated with various tones could be isolated, what symphonies would be in the making!

Aryt Schuchter
Jamaica Plain, MA

HUMAN FIREBALLS

I was very disappointed to find half-baked "pyrotrons" [theoretical subatomic particles that may cause spontaneous human combustion] in the pages of *Science Digest* ["Human Fireballs," October 1981]. . . . Mr. Arnold's shallow postulation of the "pyrotron" is not enlightening or scientific. My recent postulation of the "crouton" (responsible for the crispiness in certain salads) is, by far, more valuable. And still, I would not falsely embellish it with the titles and trappings of physics.

Hiram J. Huesca
Tampa, FL

HOME COMPUTERS

Re: "Home Computers Mean Power" in your August 1981 issue. I think the use of these toys has gone far enough. Why not try to improve the logic and mental functions of the computer in our heads?

Alex Fleming
Barnet, England

THE LONGEST SNAKE

The longest snake ever recorded is an anaconda that measured 37.5 feet, while the maximum recorded length for a reticulated python is 33 feet. The king cobra is regarded as the longest venomous snake in the world, capable of obtaining a length of 18 feet. The longest snake in the United States is the indigo snake, with a recorded length of 103.5 inches.

I would also like to respond to R.L. Jarrett's letter [September 1981] regarding a 6-inch-long fossil viperine tooth indicating a 60-foot-long snake. The Gabon viper has fangs that can obtain a length of 2 inches on specimens a maximum length of 7 feet. This indicates the fossil snake was only about 23 feet.

Michael A. Foertsch
Huntington Beach, CA

More letters on page 112

Please send your letters to: Editor, Science Digest, 888 Seventh Ave., NY, NY 10106.

NO PAST
NO PRESENT
ONLY THE FUTURE
OUT INTO THE UNIVERSE
THEY JOURNEYED AND FOUND
. . . . . THE ANSWER . . . . . .

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Reptiles of the World by Raymond

MAGAZINE: SCIENCE DIGEST
DATE: FEBRUARY 1982

LETTERS

Continued from page 45

THE LONGEST SNAKE

In 1910, explorer Algot Lange, while traveling in northwest Brazil, shot and killed a 58-foot boa constrictor with a circumference of 5 feet 8 inches.

Lange's account was published in 1911 by the *New York Herald* and included a photograph of the snake. However, there is no measurable object in the picture that would help confirm the snake's length.

Though there were four printed references to this incident at that time, it has not been mentioned again in 70 years.

Gary Mangiacopra
Milford, CT

Although I can't offer evidence of a "record" snake for your fascinating search, nevertheless I can't accept Brian Polsley's "photographic evidence" of the 30-foot python printed in the September 1981 Letters section.

The photo is evidence only that the python is longer than 17 feet. Note that the python extends across the equivalent of 10 men standing shoulder to shoulder. . . . Allowing a generous 1.66-foot width per man, the snake is nowhere near 30 feet in length.

Cdr. K.A. Lee
U.S.S. *Gato*
U.S. Navy

BILLIONS?

You quote Niles Eldredge of the Museum of Natural History as follows: "Our theory is based on the observation that new species seem to appear suddenly and then hang on for five to ten billion years without change. . . ." ["Challenging Darwin" with the main article, "Evolution: Selection for Perfection," December 1981.]

Can you name just one living species that ever hung on for five, let alone ten, *billion* years?

Ernest Franke
Annandale, VA

Our thanks go to Mr. Franke for pointing out our typographical error. Of course, Niles Eldredge, Ph.D. in geology, said

TROBRIAND

Continued from page 105

forage on the shore for shellfish, cook ar
carry the water, while men fish and hur
build canoes and make trading expec
tions. Men build the framework of hous
and women do the thatching. In additio
there is a strict division of possessions
each household. Husband and wife ea
own and care for their own personal b
longings, including clothing. Weiner
ports that most marriages are stable,
though divorces do occur. The w
returns to the village in which she w
born, but the marriage is far from ov
Should the woman marry again, howev
her new husband must give a gift to
first husband. At this point, her divorc
considered complete.

EXCHANGE RITUALS

Once married, the husband begins
participate in a ritualized exchange
gifts with his wife's lineage. Present
yams, fish, vegetables, ax blades, sh
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Sagali are undertaken by both the w
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repayment for those who helped wi
burial service or were especially ki
the deceased during life. Men comp
accumulate yams, pigs and valuab
give away, the one who gives awa
most gains the most glory. Women

Reptiles of the World by Raymond Lee
Ditmars, Litt.D. curator of mammals + [illegible] the
N.Y. Zoological Park - N.Y. N.Y. Macmillan Co
co - 12 printing 1966

and glands for the secretion of a specific virus, all the species of this family may be termed entirely harmless, as they are absolutely lacking venomous properties. It would be inappropriate to describe the monster pythons, however, as quite devoid of harm. Most of them are vicious and can produce formidable lacerations with their long, recurved teeth. A few large individuals are bold enough to retain a bulldog grip upon a man and follow this advantage with a coil or two of the body that could crush out a human life. An eighteen or twenty-foot snake, if viciously inclined, could easily overpower a man and, if the latter had narrow shoulders, could swallow him. There are reliable records of pythons swallowing children—that is, in tropical countries, but no captive snake is bold or hungry enough to devour a human, clad in the garb of civilization.

The dimensions of even the largest members of the *Boidæ* have been much exaggerated. After careful investigation the writer feels satisfied that the Ular-Sawa, also called Regal or Reticulated Python, *Python reticulatus,* is the largest species of serpent, actually attaining a length of thirty feet. It inhabits Burma, Indo-China, the Malay Peninsula and Archipelago. Secondly we must rate the India Python, *P. molurus,* of southern India, China, the Malay Peninsula and Java, which grows to a length of twenty-five feet. A close third is the South American Anaconda or Water Boa, *Eunectes murinus,* occasionally represented by specimens over twenty feet long, and fourth, the African Python, *P. sebæ,* growing to a length of eighteen, sometimes twenty feet, and very stout in proportion to its length. These are the giants among snakes and the dimensions given are considerably in excess of the average. Following is the *average* length of what we may call large examples of the four species:

Regal Python, *Python reticulatus*	22 feet.
Indian Python, *Python molurus*	18 feet.
Anaconda, *Eunectes murinus*	17 feet.
African Python, *Python sebæ*	16 feet.

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THE GREAT CONSTRICTING SNAKES—FAMILY BOIDÆ

Gigantic proportions over other creatures of their kind and brilliant colors woven into weird and symmetrical patterns place the Boas and Pythons among the most sensational of reptiles. It must not be imagined, though, that all members of the *Boidæ* are of massive proportions. The family is composed of but a moderate number of species and while it contains the huge pythons of India, Malaysia and Africa, and the great Anaconda or Water Boa, of South America, there are moderate-sized, arboreal species and a number of really diminutive, burrowing snakes, some of them living in the sterile sands of the desert regions.

One of the characteristics about the members of the *Boidæ* is the protrusion of a pair of internal hind legs in the shape of a pair of stout spurs, at the vent; internally, there are vestiges of pelvic bones, as well. This is a curious condition—true snakes with better developed limbs than some of the burrowing lizards. Moreover, the limbs of a boa or python are vigorously movable; the spurs are capable of inflicting an ugly scratch. A photograph shows the spurs of an Indian python.

All members of the *Boidæ* are clad in rather small scales above; on the abdomen is a row of enlarged crawling plates that are proportionately much narrower than among the greater number of snakes. The plates under the tail may be in one or two rows. Among the present serpents both upper and lower jaw bones as well as the palatine bones are well provided with recurved teeth; among the pythons, several species have lancet-shaped teeth that are of great value in aiding the reptile in securing a firm and instant hold of the prey while the coils of the body are thrown about it for constriction. Boas and pythons generally have the lower jaw suspension of the typical snakes, enabling large prey to be worked into the mouth and consequent enormous distension of the entire jaw mechanism.

Speaking from the standpoint of poison-conducting teeth

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Regal Pytho
Indian Pyth
Anaconda,
African Pyt

attains a length of sixteen to eighteen feet. It inhabits Central and South Africa. Not many examples are shipped to America and the species is seldom exhibited with the shows. It becomes quite docile in captivity.

Species of the genus *Python* range over the greater parts of the tropics and semi-tropics of the Old World. Not all of them are of large size. The DIAMOND SNAKE, *P. spilotes,* of Australia and New Guinea, is full grown when six or eight feet long. It is a handsome creature, black above, with a yellow spot in each scale. On the sides are rows of spots or rings, producing a pleasing pattern.

Species of the genus *Python* have the plates under the tail—*subcaudals*—in two rows. Several closely related genera are recognized.

The Boas proper, forming the subfamily *Boinæ,* range in size from small burrowing species to gigantic serpents. The plates under the tail are usually in one row. The true boas are not, as is popularly imagined, confined to the New World. Most of the larger species inhabit Mexico, Central America, tropical South America and the West Indies. A single, small species occurs in the extreme western part of the United States, ranging as far north as Oregon. One genus, *Eryx,* is composed of small burrowing forms inhabiting southern Asia and northern Africa. Two fine members of the genus *Constrictor* are found in Madagascar. Several genera besides *Eryx* are confined to the Old World.

In the New World the largest of the boas is the ANACONDA or WATER BOA, *Eunectes murinus,* of Central America and tropical South America, a species alleged to grow twenty-five feet long, though individuals of such proportions seem to be so rare they never find their way to zoological institutions. Two fine specimens of this really aquatic snake are on exhibition in the Reptile House of the New York Zoological Park. The largest is seventeen feet long. She gave birth to thirty-four young, which were each twenty-seven inches long and an inch in diameter at the thickest part of the body. The coloration was the same

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11. Snakes - The Big Five and their Relatives -

~~Giant Reptiles~~
by Sherman A. Minton Jr
+ Madge Rutherford Minton
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It is sometimes hard to tell where tales of purely mythical giant snakes end and those of presumably real giant snakes begin. The Midgard Snake that encircles the earth, and Yulungurr, the great python of the Australian bushmen whose body spans the heavens like a rainbow, are clearly symbolic animals having no more real existence than the British lion or the Russian bear. Mythical surely, if not symbolical, is the story told by the Indians of British Guiana, who say that a group of their people were making their way through dense jungle when they came to a smooth wall too high to climb. After following it two days, they found it ended in the head of a gigantic anaconda, and they fled lest they arouse the sleeping monster.[1]

When Alexander the Great's soldiers told of snakes in India that had eyes as large as shields and were able to swallow oxen and stags, they were unquestionably speaking of real animals, probably the Indian python and the crocodilians of the Indus. But medieval scholars never questioned that India and Ethiopia bred snakes large enough to swallow elephants, and Chinese literature mentions the Pa snake which could accomplish the same feat, ejecting the bones after a period of three years.[2]

Even today, people will believe almost anything about snakes and accept almost any figure for the maximum length they reach. A Brazilian newspaper article in 1948 told how a detachment of

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CHAPTER II

SIZE AND FOOD VALUE

Questions about the largest snakes are difi
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have seen snakes fifty or sixty feet long are
Yet there is no doubt that there are large
the Amazon and its tributaries than have y
especially about the great swampy Ilha de
lies at the Amazon's mouth. These snakes
reported maximum of fourteen metres (fort
doubtful if this is ever much exceeded. A s
size has been credibly reported to Dr. Afra
the principal authority in South America.
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is preserved at Butantan in Brazil. The au
Malayan python twenty-nine feet long, and
seven feet long There are at least two now
America which are over twenty-five feet. C
professional collector of living animals, is saic
in the State of Negri Sembilan in Malaya a p
thirty-two feet long, which he took alive t
Rattlesnakes grow to great size in Florida
plains of southern Texas, but the great n
species and those that are probably most pr
characteristics are not very large or very d
The longest poisonous snake is the king
dryas hannah Cantor) of southeastern Asia,
relatively light and slender, reaches eighteen
The mambas (Dendraspis) of Africa are alsc
whip-like.

the army had to be called to dispatch an anaconda 156 feet long that knocked down buildings and upset automobiles before it was finally killed. This account was repeated in a 1971 magazine story along with a report of a 131-foot anaconda illustrated on a picture postcard. The photographer was doubtless inspired by the bronco-sized jack rabbits often shown on post cards from Texas.[3]

Captain C. R. S. Pitman, a British naturalist and authority on African snakes, was told in all seriousness of a 130-foot python that inhabited a pool in the Bwamba escarpment of Uganda. It was said to be of prodigious age and venerated by the local people; however, they eventually killed and ate it. Pitman's informant obtained "the mouth with teeth and two pieces of its vertebra," but these apparently never reached a scientific collection. Regarding the snake's length, the informant said, "I have no reason to disbelieve what the headman says: he is a reliable man and he measured it with a linear tape measure . . . every single soul who was present when the snake was measured states that it much exceeded the tape measure. . . . I was shown the place where they stretched it out . . . this was certainly approximately 130 feet."[4] Stories of such snakes remind me of an old saying from my ROTC days about the Springfield rifle: "It weighs 9.8 pounds. After you've carried it a couple of miles, the decimal point drops out."

Leaving aside for the moment the purely mythical serpents and the sea monsters whose exegesis is a specialty in itself, what are the giant snakes of the world and what size do they attain? There are five truly giant snakes that are known to reach lengths of 20 feet or more: the anaconda, reticulated python, African python, Indian python, and amethystine python. A dozen or so additional species fall in the 10- to 19-foot range. All the rest of the 2,700-odd species of living snakes are under the 10-foot mark, although a few are so heavy that they outweigh some of these that reach lengths greater than 10 feet.

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Reptiles + Amphibians

by Thomas Barbour - curator of Reptiles and Amphibians in the Museum of Comparative Zoology at Harvard College

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Large size is an attribute which snakes apparently developed early in their history, and all the largest snakes today are members of the archaic family Boidae. This family flourished about 50 million years ago during the Eocene, and some of its members, such as *Gigantophis* of Egypt and *Madtsoia* of Patagonia, reached lengths of about 33 feet.[6] Assuming that these fossils were of average-sized rather than exceptionally large individuals, these snakes must have been bigger than any present-day boas or pythons. At about the same time there were some very large, apparently marine snakelike creatures around. Their remains are so fragmentary that the size cannot be reliably estimated, and there is some question whether they were really snakes. *Palaeophis*, whose fossils have been found in Europe and the United States, may have been a very elongate mosasaur, and it has been suggested that *Archaeophis* was a giant eel rather than a snake.[7] The survival of a few of these creatures down to recent times has been suggested as a factual basis for some of the sea-serpent stories, but it seems totally unlikely that such a creature, which would be air-breathing and probably an inhabitant of comparatively shallow waters, could survive undetected by science.

The division of the family Boidae into boas and pythons is based on certain skeletal features, such as the presence in pythons of a separate supraorbital bone and premaxillary teeth, and one interesting biological feature—all boas, so far as known, are live-

Eunectes Murinus – Age 29 years
Constrictor Constrictor 25

bearing, while all pythons lay eggs. Boas are found in both the New and the Old World, while all pythons are Old World snakes. For a long time, *Loxocemus*, a moderate-sized shiny brown snake found from western Mexico to Costa Rica, was believed to be a python and was referred to in popular books as the Mexican dwarf python, or Colima python. Recent work indicates that it is not a python, although there is some question as to just where it does fit in the scheme of snake classification. Most evidence suggests that it is a primitive species with no close living relatives. The boas and pythons together form a rather heterogeneous family. The small West Indian boas of the genus *Tropidophis* and the even smaller rubber boa and rosy boa of the western United States have no more in common with the boa constrictor than that species does with the Indian python. The little burrowing Calabar python of West Africa is another highly aberrant species, very different from the larger pythons. This snake, like the Colima python, may be a remnant of an almost vanished group of primitive pythonlike snakes.

In addition to being an ancient family of snakes, the boas and pythons seem to be one that is declining. The family contains about seventy-five living species, and many of them are either rare or very limited geographically or both. Most of the biggest species, however, have extensive ranges and, until reduced in numbers by twentieth-century man, were fairly plentiful. In all tropical regions of the world, there seems to be room for one or two species of really big snakes; however, the ecological niches for such reptiles are stringently limited. Any snake of 15 feet or more is of necessity a master predator and must take its cut from near the top of the food pyramid. Here it is in competition with large carnivorous mammals, the very largest raptorial birds, and the crocodilians. All of these are occasionally foes as well as competitors, so a giant snake's life is somewhat chancy even when it is well grown, not to mention the period when it is a tasty unprotected infant. The smaller species of boas and pythons have found it hard to compete

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successfully with the more recently evolved snakes. Most of the modern snakes fall into a huge, untidy family that most herpetologists still call the Colubridae, although a few brave souls have tried to split it up into natural subdivisions. The colubrid snakes, substantially assisted by the venomous elapids and vipers, have tended to push the smaller boas and pythons into restricted niches such as islands, deserts, and cloud forests.[8] Why this should be so is not clear. Perhaps the colubrids and other modern snakes are a little faster in their reactions, reach maturity sooner, are better able to withstand rapid changes in temperature, and utilize available food supplies better than their conservative ancestors. Nevertheless, the boas and pythons have managed to keep a stranglehold on the niche for giant species.

The Anaconda

Two American herpetologists, James A. Oliver, director emeritus of the American Museum of Natural History and director of the New York City Aquarium, and Clifford H. Pope, formerly on the staff of the Field Museum of Natural History, have provided excellent critical evaluations and summaries of the records of maximum length attained by the giant snakes. They agree that when both length and bulk are considered, the largest snake in the world is unquestionably the anaconda. This enormous boa is found in streamside and swamp habitats in South America east of the Andes from Colombia and Venezuela to northern Bolivia and south central Brazil. There are several apparently reliable records of anacondas more than 30 feet long. A party of oil prospectors working in the region of the upper Orinoco River in eastern Colombia shot an anaconda that was 37.5 feet long by measurement with a surveyor's tape. After measuring the snake, they left it for a short time and returned to their work. When they returned to skin it, the reptile was gone. Evidently it had recovered enough to crawl away. Fredrico Medem, a Colombian herpetologist and expert on crocodilians, saw an anaconda which he estimated as between 30 and 40 feet long and obtained a report of a specimen 10 meters, 25 centimeters (about 34 feet) long that was killed on the Rio Guaviare in Colombia in 1956. General Candido Mariano de Silva Rondon of the Brazilian army, a reliable explorer and naturalist, measured an anaconda slightly over 38 feet long that had been killed by Indians in south central Brazil. Afranio do Amaral, a herpetologist long associated with Brazil's Instituto Butantan, which is famous for research on venoms of snakes and other poisonous animals, assembled numerous reports of very large anacondas; the biggest he considered reliable being one of a snake 11 meters, 28 centimeters (slightly over 38 feet). Vincent Roth, former director of the British Guiana Museum, on the Barima River in 1921, shot an anaconda which he estimated as having a length of 34 feet.[9] All these are actual measurements made by presumably reliable persons, or the estimates of naturalists familiar with large snakes in the field. There are numerous less well authenticated accounts, ranging up to an estimate of 62 feet for a specimen killed by the English explorer Major Percy Fawcett on the Rio Abuna near the Brazil-Bolivia border in 1907.[10] Unfortunately, all these encounters took place in the remote hinterland of South America, and no part of the snakes in question was saved to support the story. To the best of our knowledge, no anaconda over 25 feet long has ever reached a zoo or museum in the United States or Europe.

For all its impressive size, the anaconda is little known, and there is even doubt whether it constitutes one species or several. The latest catalogue of South American snakes indicates that there is one subspecies in the Amazon drainage and another in northern South America. In 1936, two species were described from Marajo

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Island at the mouth of the Amazon, but they may be only variants of the widespread Amazon form.[11] Further south in South America, chiefly in the drainage basins of the Paraguay and Parana rivers, there lives the smaller southern anaconda, whose maximum length does not exceed 12 feet.

The name anaconda is of Sinhalese origin and was originally applied to the Indian python. The Portuguese evidently brought the name from Ceylon to Brazil, where it became associated with the largest snake of the New World. Aboma is another name used for the anaconda in some of the older literature. This is an African name also originally applied to a python but brought to America by Negro slaves and given to a different snake. The anaconda also has several names in South American Indian dialects. *Sucuri* is a common name in Brazil, and *camudi* in Guiana.

Like all the big constricting snakes, and like the great majority of snakes large and small in the tropics, the anaconda is most active at night. However, in several accounts of encounters with giant anacondas, the snake was found in the open during the day and appeared to have recently swallowed a large meal. Perhaps after such large feedings snakes seek the sun's warmth to help speed digestion. On the other hand, they may simply have been too gorged to seek their usual diurnal shelter.

The Reticulated Python

The late Raymond L. Ditmars, formerly of the Bronx Zoo, whose popular books on snakes greatly influenced our generation of herpetologists, considered the reticulated python the largest of snakes. He gave the record length as 33 feet. This is probably based on an account by the late Henry C. Raven, an American museum